

## Cardiovascular Disease and Diet: the Public View

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### Synopsis .....

*A national probability sample of the public was asked questions dealing with perceived relationships between*

*diet (especially sodium, cholesterol, and saturated fats) and cardiovascular disease (CVD). More than half of the respondents were aware of the suspected relationship between sodium and hypertension, and nearly half were aware that saturated fats and cholesterol may be factors in other types of CVD. Majorities expressed concern about these substances, and substantial minorities claimed to be making efforts to reduce consumption of them. The data provide a baseline against which future developments may be measured.*

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**T**HERE APPEARS TO HAVE BEEN A SHIFT over the past several decades in the nature of public awareness and concern about food safety. At one time, concern was focused almost exclusively on potential immediate harm from adulterated or contaminated foods (for example, poisoning and botulism) and on readily evident deficiency diseases such as protein deficiency, scurvy, and pellagra. With the growing abundance of food, ever-improving technology of food processing, and increasing government regulation of food safety, the incidence, and consequently the degree of public concern with these problems, has diminished.

A Food and Drug Administration (FDA) survey conducted in 1980 (1) to examine the public's perception of food safety found that fewer than 0.5 percent of the respondents expressed any concern about adulteration, lack of purity, or contamination. At the same time, the role of diet in fostering long-term health—or, alternatively, in contributing to cardiovascular disease (CVD), cancer, and other delayed-onset diseases—has been increasingly recognized and has become a source of concern. By 1978, the public was expressing, by a two-to-one margin, a preference for information about such food components as sodium, fats, and cholesterol over information about protein, vitamins, and minerals (2). Among nutritionists and other food professionals, the emphasis on delayed-onset diseases and on substances that are suspected to play a role in these diseases is even more marked (3).

Food components that have recently been most widely discussed in the public press as long-term threats to health include fats (and particularly saturated fats), cho-

lesterol, sodium, alcohol, caffeine, saccharin, and various preservatives and colors. Disorders linked to diet in the public press have included CVD, cancer, birth defects, hyperkinesis, diabetes, and the common cold. Media discussions of such issues, unfortunately, vary widely in accuracy and completeness. Some degree of oversimplification is almost inevitable, with a tendency to reduce hypothetical complex relationships to simple and unqualified one-to-one causal statements of the form "x causes y."

In the spring of 1982, the FDA and the National Heart, Lung, and Blood Institute (NHLBI) initiated a consumer survey to explore a number of issues related to these concerns. The survey focused on knowledge of hypertension and awareness and usage of sodium labeling, but early phases of the interview addressed public perceptions of dietary relationships with CVD in general. CVD was chosen for study because it is identified by both consumers and food professionals (nutritionists and food industry trade association members) as the most important diet-related health problem in the nation (3).

The data reported here reflect public perceptions as of late 1982. As such, they provide a baseline against which changes in these perceptions over time may be measured. Public perceptions are reported as they stand; no attempt is made to classify them as correct or incorrect. For one reason, the cause of CVD is multifactorial and the role of various dietary components, alone and in interaction, is not well understood. For another, public perceptions often exhibit lack of awareness of all relevant factors; for example, very few consumers mention genetic susceptibility in attributing a causal link between sodium con-

*'The data-collection methodology selected was telephone interviewing using a national probability sampling design based on random-digit dialing.'*

sumption and hypertension. Most important, however, is the fact that people's behavior is based on their perceptions of reality, regardless of the accuracy of these perceptions. In predicting, for example, whether a given person will purchase a low-sodium product or read label declarations of sodium content, the important question is not whether that person's sodium consumption actually poses a threat, but rather whether the person perceives it to be so.

## Methods

**Survey design.** The data-collection methodology selected was telephone interviewing using a national probability sampling design based on random-digit dialing. Telephone interviewing, as compared with personal interviewing, offers a number of advantages (4). These include substantially reducing costs, avoiding inflation of error variances resulting from clustering effects of multi-stage area sampling designs, and bypassing security measures (both the increasingly prevalent "lock-out" apartment buildings and residential communities and the growing reluctance of people to open their doors to strangers). The only disadvantage of telephone techniques (other than the inability to present visual stimuli, which was not relevant to the study) is the loss of households without telephones. However, since recent census data (5) reveal that 97 percent of U.S. households have telephone service, this is no longer a major problem. Indeed, it has been determined that the resultant bias on estimates of substantive variables amounts to less than 1 percent (6), considerably less than the effect of security measures on personal interview surveys.

If telephone sampling were based upon public directories, large biases would be introduced by nonlisted numbers and by high rates of mobility. For this reason, random-digit dialing methods (7) were used, in which random four-digit sequences are attached to area codes and exchanges. This gives all households in the country an equal probability of being selected.

Within households, a random selection grid was used to select the designated respondent from among all adults (ages 18 or older) in the household. Spanish-speaking interviewers were available and used as necessary. Interviewing was performed during October and November

1982, by the staff of Market Facts, Inc., under contract with and using questionnaires developed by the FDA. Four attempts, systematically varied across days and times, were made for each telephone number. This resulted in a contact rate of more than 90 percent.

A more serious problem was a relatively high refusal rate of nearly 30 percent. This high rate (average is about 20–25 percent) was due to the requirement of selecting a randomly designated respondent within the household rather than interviewing whoever answered the telephone, which meant that usually two people had to agree to participate—the original contact and the designated respondent. As is usually the case in both personal interview and telephone surveys, refusal rates were differential across demographic groups, being higher among males, among minority groups, and among the under-educated. There is no reason, however, to suspect direct bias of substantive variables; respondents who agreed to participate (for example, black males) are representative of their demographic groups. Weighting of the sample to census-derived population values would result in changes of less than 2 percent in reported total population estimates. A total of 4,000 interviews was completed.

**Survey instruments.** Four different questionnaires were used in the survey, differing in content for approximately the first quarter of the interview but identical for the remainder. Each questionnaire was administered to one replicate (subsample) of 1,000 persons; each replicate constitutes an independent national probability sample. One replicate received questions dealing with concern about consumption of fats and cholesterol, and two replicates were asked questions dealing with the relationship between diet and health. (The questions asked of the fourth replicate are not relevant to this report; they dealt primarily with usage of ingredient listings and have been reported elsewhere (8,9).)

Two approaches were used to estimate perceptions of relationships between diet and health. "Disease-anchored" questions named a health problem (for example, high blood pressure) and asked about possible dietary factors; "substance-anchored" questions, conversely, named a food component (for example, sodium) and asked about health problems believed to be related to consumption. Respondents in one replicate received disease-anchored questions while those in another replicate received substance-anchored questions.

This dual approach was chosen because people's ability to state a relationship between "x" and "y" is not always the same in both directions. For example, more people know that 25 percent equals  $\frac{1}{4}$  than know that  $\frac{1}{4}$  equals 25 percent (10). Such asymmetry arises when one side of the equation (in this case "25 percent") is high in people's "recognition hierarchy"—they know it when

they see it—but low in their “production hierarchy”—they cannot use it appropriately. Furthermore, asymmetry is particularly likely where the relationship being examined is inherently directional, as in this case. When a respondent states that there may be a relationship between sodium and hypertension, for example, it is clear that sodium consumption is the antecedent and hypertension the consequent rather than vice versa. Since people’s ability to indicate awareness of a possible relationship depends on how their memories of this linkage are organized and stored, there is no *a priori* reason to feel sure that measured awareness will be equal in both directions.

**Statistical significance of the data.** Data based upon all 4,000 respondents have a maximum 95 percent confidence interval of  $\pm 1.7$  percent; that is, for each reported data point, one can be 95 percent confident that a survey of the entire population would provide data differing by not more than 1.7 percent from the percentage reported. Most of the data in this report are based on responses obtained from single replicates of 1,000 persons each; the maximum 95 percent confidence interval for these data is  $\pm 3.4$  percent. Footnotes to each table give the description of the sample on which data in the table are based, the number of respondents, and the maximum 95 percent confidence interval.

## Results and Discussion

**Demographic description of the sample.** The sample closely matches census figures with regard to demographic characteristics (table 1). Three groups significantly underrepresented in the sample are males, Hispanics, and the severely undereducated (less than eighth grade). As discussed previously, these deviations are due to differential refusal rates and have minimal impact on total population estimates.

**Perceived relationships—disease anchors.** Respondents in one replicate were asked about dietary factors related to hypertension (“high blood pressure”) and to heart or cardiovascular problems other than high blood pressure. In both cases, they were asked if they had read or heard anything about these problems being related to “things people eat or drink,” and if so, to what things.

**Hypertension.** Four out of five respondents (81 percent) claimed to have heard or read that hypertension may be related to diet (table 2). More than half of all respondents (54 percent) named salt or sodium consumption; other frequent responses were alcohol (26 percent), fats or saturated fats (21 percent), and cholesterol (17 percent). Other dietary factors were cited by smaller numbers of respondents.

*‘The most significant changes since 1979 . . . appeared in perceptions of relationships between hypertension and dietary factors, particularly salt or sodium consumption. Mention of the relationship of salt or sodium to hypertension has nearly tripled. . . .’*

Table 1. Demographic characteristics of sample and census populations

Characteristic	Percent	
	Sample	Census (5)
Age, years	100	100.0
Less than 25	14	13.8
25–34	24	24.6
35–44	18	16.8
45–54	14	14.3
55–64	13	13.9
65 and older	15	16.6
No answer—refused	2	...
Education	100	100.1
8th grade or less	7	16.7
9th through 11th grade	11	13.6
12th grade or high school graduate	42	37.5
1–3 years of college	20	15.1
4 or more years of college	20	17.1
Race—ethnic group	100	100.0
Black, non-Hispanic	9	11.3
White, non-Hispanic	84	80.5
American Indian-Alaska Native	2	0.7
Asian-Pacific Islander	1	1.3
Hispanic	3	6.2
No answer or refused	1	...
Sex	100	100.0
Male	37	47.7
Female	63	52.3
Household income, dollars	100	100.0
Less than 5,000	8	10.5
5,000–9,999	10	14.9
10,000–14,999	13	14.4
15,000–19,999	14	12.3
20,000–24,999	12	11.4
25,000–34,999	14	17.2
35,000–49,999	9	12.1
50,000 and over	4	7.2
No answer, refused, or don’t know	16	...
Region	100	100.0
East	23	21.5
South	30	33.5
Midwest	29	25.7
West	18	19.3

*'The proportion of respondents claiming to have heard of dietary links with heart or cardiovascular problems other than hypertension, 58 percent, was lower than with hypertension, 81 percent.'*

Table 2. Perceived dietary factors related to high blood pressure<sup>1</sup>

Factor	Percent
Any dietary factors named	78
Salt, sodium, or salty foods	54
Alcohol	26
Cholesterol	17
Fats	17
Caffeine, coffee, tea, or colas	9
Sugar or sweet foods	6
Calories or excessive food consumption	6
Pork	5
Tobacco or smoking	4
Saturated fats	4
Starch or starchy foods	3
Additives, preservatives, or colors	2
Fried foods	2
Specific meat other than pork	2
Meats generally	1
Calcium or dairy products	1
Have heard is diet related, don't know specific substances	3
Have not heard about diet relationship	19
<b>Total</b>	<b>100</b>

<sup>1</sup> All respondents in one replicate ( $N = 1,000$ ); maximum 95 percent confidence interval =  $\pm 3.4$  percent.

NOTE: Includes all responses given by more than 0.5 percent of the respondents.

Another question, addressed to all 4,000 respondents later in the interview, asked them to name "some of the likely causes of high blood pressure" without specifying dietary factors. This question was also asked in a comparable survey conducted by NHLBI in 1979 (11), thus permitting assessment of changes over the past 3 years.

As shown in table 3, the most frequently offered response (50 percent) to causes of high blood pressure in the current survey was "emotional pressure, worry, or stress." This was unchanged since 1979. The next most frequently named nondietary factor in hypertension was heredity, cited by 16 percent of the respondents, significantly higher ( $P < 0.01$ ) than the 12 percent who named this 3 years earlier. Overwork was mentioned by 7 percent and smoking by 6 percent, a significant ( $P < 0.01$ ) decline from the 10 percent who cited smoking in 1979.

The most significant changes since 1979, however, appeared in perceptions of relationships between hypertension and dietary factors, particularly salt or sodium

consumption. Mention of the relationship of salt or sodium to hypertension nearly tripled; 34 percent of the respondents in the current survey named salt or sodium, compared with only 12 percent 3 years earlier ( $P < 0.01$ ). Mention of fats or cholesterol also increased significantly ( $P < 0.01$ ), from 6 to 16 percent of the respondents. A third (32 percent) of the respondents cited generally poor or unbalanced diets and 27 percent named obesity or excess caloric consumption, both little changed from 1979.

*Other cardiovascular diseases.* The proportion of respondents claiming to have heard of dietary links with heart or cardiovascular problems other than hypertension, 58 percent, was lower than with hypertension, 81 percent (table 4). The food components most often specified were cholesterol (26 percent), fats (18 percent with an additional 5 percent specifically naming saturated fats), alcohol (13 percent), and salt or sodium (11 percent).

**Perceived relationships—substance anchors.** Because the food components most often named as possibly

Table 3. Perceived "likely causes" of high blood pressure compared with data from a 1979 survey

Factor	Percent	
	1982 data <sup>1</sup>	1979 survey <sup>2</sup>
<b>Nondietary factors:</b>		
Emotional pressure, worry, or stress	50	49
Heredity	16	12
Overwork or overexertion	7	6
Smoking	6	10
Lack of exercise	4	7
Heart or cardiovascular disease	2	2
Kidney disease	1	<1
Diseases other than heart or kidney	2	4
Aging	1	1
Some drugs or medications	1	<1
<b>Dietary factors:</b>		
Salt-sodium	34	12
"Generally poor, improper, or unbalanced diet"	32	30
Overweight-obesity	27	26
Fats or cholesterol	16	6
Alcohol	9	8
Pork	1	2
Caffeine, coffee, tea, or colas	1	<1
Not sure or don't know	10	16

<sup>1</sup> All respondents ( $N = 4,000$ ); maximum 95 percent confidence interval =  $\pm 1.7$  percent.

<sup>2</sup> National Heart, Lung, and Blood Institute Survey (11).

NOTE: Includes all responses given by more than 0.5 percent of the respondents.

related to CVD were sodium, cholesterol, and fats (particularly saturated fats), they were further explored in substance-anchored questions, which named a substance and asked about possible health relationships.

Respondents in a second replicate were asked whether they had heard about any health problems that "might be related to how much" salt or sodium and cholesterol or saturated fat people consume, and, if so, what problems.

*Salt or sodium.* Three respondents in four (73 percent) claimed to have read or heard about health problems possibly related to consumption of salt or sodium (table 5). Half (51 percent) named hypertension and 29 percent mentioned "heart problems" or "heart attacks"; smaller numbers cited excess fluid retention (9 percent) or uremic diseases (6 percent).

That 51 percent named hypertension as related to salt or sodium consumption is consistent with the above-reported fact that 54 percent (of a different group of respondents) named salt or sodium as being related to hypertension. It can therefore be concluded with a high degree of reliability that a little over half of the public is currently aware of the suspected link between hypertension and salt or sodium consumption.

*Cholesterol or saturated fat.* Sixty-three percent of the respondents claimed awareness of health problems possibly related to consumption of cholesterol or saturated fat (table 5). Most frequently named were heart attacks or heart problems (42 percent), arteriosclerotic disease (26 percent), and hypertension (10 percent).

Table 4. Perceived dietary factors related to heart or cardiovascular problems other than hypertension<sup>1</sup>

Factor	Percent
Any dietary factors named	53
Cholesterol	26
Fats	18
Alcohol	13
Salt, sodium, or salty foods	11
Calories or excessive food consumption	5
Saturated fats	5
Tobacco-smoking	5
Sugar or sweet foods	3
Dairy products, milk, or butter	3
Caffeine, coffee, tea, or colas	3
Specific meat other than pork	2
Additives, preservatives, or colors	1
Pork	1
Starch, starchy foods	1
Meats generally	1
Fried foods	1
Have heard is diet related, don't know specific substances	5
Have not heard about diet relationship	42
Total	100

<sup>1</sup> All respondents in one replicate (N = 1,000); maximum 95 percent confidence interval = ± 3.4 percent.

NOTE: Includes all responses given by more than 0.5 percent of the respondents.

Table 5. Health problems seen as related to consumption of sodium, cholesterol, and saturated fat

Health problem	Percent
<i>Consumption of salt or sodium<sup>1</sup></i>	
All health problems named	70
Hypertension (high blood pressure)	51
Heart or cardiovascular problems other than hypertension	29
Excess fluid retention	9
Uremia or kidney disease	6
Diabetes	2
Stroke	1
Have heard consumption is bad; don't know problem	4
Have not heard of any problems	27
Total	100
<i>Consumption of cholesterol and saturated fat<sup>1</sup></i>	
All health problems named	57
Heart problems, heart attacks, coronary problems	42
Atherosclerosis (fat buildup in arteries) or arteriosclerosis (hardening of arteries)	26
Hypertension (high blood pressure)	10
Obesity, weight gain	2
Stroke	2
Cancer	1
Diabetes	1
Have heard consumption is bad; don't know problem	5
Have not heard of any problems	37
Total	100

<sup>1</sup> All respondents in one replicate (N = 1,000); maximum 95 percent confidence interval = ± 3.4 percent.

NOTE: Includes all responses given by more than 0.5 percent of the respondents.

rated fat (table 5). Most frequently named were heart attacks or heart problems (42 percent), arteriosclerotic disease (26 percent), and hypertension (10 percent).

Again, disease-anchored and substance-anchored questions provided similar estimates of the extent of public perception of a link between CVD and consumption of cholesterol and saturated fat: somewhat less than half of the public was aware of the possible relationship.

### Extent of Public Concern

**Sodium.** The entire study group was asked:

- Are you on a low-salt or low-sodium diet recommended by a doctor or other medical professional?
- Which of these statements would best describe your own feelings about sodium or salt consumption?

As shown in table 6, 12 percent of the respondents were then on a medically advised low-sodium diet; another 33 percent were attempting on their own initiative to reduce their sodium intake, with varying degrees of success. About half (53 percent) reported making no effort to reduce their consumption of sodium, although a

*'Sixty-three percent of the respondents claimed awareness of health problems possibly related to consumption of cholesterol or saturated fat.'*

Table 6. Concern about sodium and fat consumption

Response	Percent	
	Sodium consumption <sup>1</sup>	Fat consumption <sup>2</sup>
"I don't think I personally have any need to worry" . . . . .	37	35
"I think I probably should reduce it but I haven't really tried" . . . . .	16	18
"I have been trying to reduce it but not very successfully" . . .	7	8
"I have reduced my consumption quite a bit" . . . .	26	22
Currently on a medically prescribed reduced consumption diet . . . . .	12	13
No answer or don't know level of concern . . . . .	2	5
Total . . . . .	100	100

<sup>1</sup> All respondents (N = 4,000); maximum 95 percent confidence interval = ± 1.7 percent.

<sup>2</sup> All respondents in one replicate (N = 1,000); maximum 95 percent confidence interval = ± 3.4 percent.

third of these felt that they probably should do so. The extent of public concern with sodium is more fully discussed in references 8 and 9.

For persons on medically prescribed low-sodium diets, hypertension appears to have been the most frequent reason for the diet. Seventy-four percent of these patients had been told at least once that their blood pressure was high. However, they frequently had other medical problems that may also have influenced the decision to prescribe a low-sodium diet:

Medical problems <sup>1</sup>	Percent
Hypertension . . . . .	74
"Seriously overweight" . . . . .	18
Had a heart attack . . . . .	16
Diabetes or a prediabetic condition . . . . .	14
"Any kind of kidney problem" . . . . .	11
Had a stroke . . . . .	5
Pregnant . . . . .	1

<sup>1</sup> N = 487; maximum 95 percent confidence interval = ± 4.5 percent.

NOTE: All health conditions were self-reported.

Those respondents who were not on medically prescribed low-sodium diets but who were still concerned

about sodium (48 percent of the sample) were asked the reasons for their concern. Half of these respondents named hypertension, one in five cited sodium's role in fluid retention, and one in eight expressed concern about heart or cardiovascular problems other than hypertension. Many respondents did not have specific adverse consequences in mind, but were simply worried that too much sodium "is not good for you" or "is more than your body needs."

Reason for concern about sodium <sup>1</sup>	Percent
May cause or aggravate hypertension . . . . .	48
"It's not good for you" (no specifics) . . . . .	32
Causes water retention, swelling, or weight gain . . . . .	20
May cause heart or coronary problems . . . . .	12
"Body doesn't need so much salt" . . . . .	12
May cause stroke . . . . .	4
May cause arteriosclerosis . . . . .	3
Not sure or don't know . . . . .	3

<sup>1</sup> N = 1,937; maximum 95 percent confidence interval = ± 2.4 percent of respondents.

NOTE: Includes all responses given by more than 0.5 percent of respondents.

**Fats.** When the 1,000 respondents in one replicate were asked how they felt about the amount of fat they consumed, 60 percent reported some degree of concern (table 6). One respondent in eight (13 percent) reported having been advised by a physician or other health professional to reduce fat consumption, and another 22 percent claimed that they had successfully reduced it on their own initiative. Twenty-six percent of the respondents expressed concern about fats but had little or no success in reducing consumption. The primary reason for their concern about fat, its caloric content, was named by 53 percent of those concerned about fat. One in three respondents cited the possible role of fat or saturated fat in CVD other than hypertension, while 7 percent mentioned hypertension.

Reason for concern about fat <sup>1</sup>	Percent
High in calories or trying to lose weight . . . . .	53
May cause heart or cardiovascular problems . . . . .	33
High in cholesterol . . . . .	13
"It's not good for you" (no specifics) . . . . .	10
May cause hypertension (high blood pressure) . . . . .	7
May cause diabetes . . . . .	3
May cause cancer . . . . .	1
Not sure or don't know . . . . .	5

<sup>1</sup> N = 595; maximum 95 percent confidence interval = ± 4.4 percent.

NOTE: Includes all responses given by more than 0.5 percent of respondents.

Concern about polyunsaturated versus saturated fats was also examined:

- Have you read or heard about different kinds of fats, like saturated fats and polyunsaturated fats?

- Are you concerned about both saturated and polyunsaturated fats, or only about one of them?

Sixty-one percent of those who were concerned about fats claimed to have read or heard about saturated fats compared with polyunsaturated fats (table 7). Of these, 64 percent (23 percent of all respondents) were concerned about all fats while 19 percent (7 percent of all respondents) were concerned only about consumption of saturated fats.

**Cholesterol.** The respondents in one replicate were asked:

- Another substance that many people think about when they think about fats is cholesterol. Are you personally at all concerned with the amount of cholesterol you consume? Would you say you're not at all concerned, a little concerned, or very concerned about cholesterol?
- Are you making any particular effort to limit or reduce the amount of cholesterol you consume?
- Did a doctor or other health professional tell you to reduce the amount of cholesterol you consume, or did you decide on your own?

Two respondents in three (65 percent) reported being concerned to some degree about their consumption of cholesterol. Twelve percent had been advised by a physician or other health professional to reduce cholesterol, and another 35 percent were attempting to do so on their own initiative:

Concern about cholesterol <sup>1</sup>	Percent
Not at all concerned.....	33
Concerned, but making no effort to reduce consumption .	19
Concerned, and attempting by own choice to reduce consumption .....	35
Attempting to reduce consumption on the advice of a medical professional .....	12
Not sure whether concerned .....	2
<b>Total .....</b>	<b>100</b>

<sup>1</sup> *N* = 1,000; maximum 95 percent confidence interval = ± 3.4 percent.

These figures indicate slightly increased concern about cholesterol since 1980, when one survey (12) found 58 percent of its respondents concerned about cholesterol. In another 1980 survey (13), 44 percent of the meal planners claimed that they had stopped buying some foods believed to be high in cholesterol; this may be comparable to the 47 percent of the current respondents who indicated that they were attempting to reduce cholesterol consumption.

**Demographic analysis.** While information about specific demographic groups is of interest to public policy planners, the sample in this study is too small to allow

Table 7. Concern about saturated versus polyunsaturated fats (percentages)

Concern	Total group <sup>1</sup>	Concerned about fat <sup>2</sup>	Aware of different fats <sup>3</sup>
Concerned about both .....	23	39	64
Concerned about saturated fats only .....	7	11	19
Concerned about polyunsaturated fats only .....	3	5	8
Not sure of type of concern ...	3	6	10
Concerned about fats, but not aware of different types of fats .....	23	39	...
Not concerned about fats at all .....	35	...	...
Not sure whether concerned...	5	...	...
<b>Total .....</b>	<b>100</b>	<b>100</b>	<b>100</b>

<sup>1</sup> All respondents in one replicate (*N* = 1,000); maximum 95 percent confidence interval = ± 3.4 percent.

<sup>2</sup> All respondents in one replicate who were concerned about their consumption of fats (*N* = 595); maximum 95 percent confidence interval = ± 4.4 percent.

<sup>3</sup> All respondents in one replicate who were concerned about their consumption of fats and who have heard about saturated and polyunsaturated fats (*N* = 361); maximum 95 percent confidence interval = ± 5.7 percent.

NOTE: Leaders ( . . . ) indicate not applicable.

examination of any but the largest categories at an acceptable level of reliability. Table 8 shows response profiles for four groups of particular interest: the undereducated, blacks, the young, and the elderly.

Significantly (*P* < 0.01) lower than average awareness of diet-health relationships is shown by the undereducated, by blacks, by the elderly, by low-income respondents, and by those living in the south. The educational level of the respondent, however, is the driving factor: if the effect of differential levels of education is partialled out, differences between demographic groups are reduced to nonsignificance. Educational level is also positively correlated (*P* < 0.01) with concern with consumption of sodium, fats, and cholesterol. If this effect is again statistically removed, blacks emerge as relatively more concerned (*P* < 0.01) with these substances, with young people (those under 35) relatively less concerned.

## Conclusions

The degree of public perception of possible relationships between diet and CVD is high. More than three-fourths of the public recalled hearing that hypertension may be related to diet, with over half being aware specifically of the possible link with salt or sodium. About half had heard of dietary links with other types of CVD; cholesterol and fats were most frequently cited, each by about one-quarter of the public.

Similarly, three-fourths of consumers had heard about adverse consequences, especially hypertension, that may be related to consumption of salt or sodium. About 6

Table 8. Awareness and concern about diet and cardiovascular disease among selected demographic groups (percentages)

Response	Total sample	Less than high school education	Blacks	Age, years	
				18-34	65 and over
<b>Awareness:</b>					
Heard hypertension is diet related	81	71	79	84	72
Named salt or sodium as factor	54	42	52	56	43
Named alcohol as factor	26	21	11	27	22
Named fats as factor	17	15	15	16	15
Named cholesterol as factor	17	8	10	20	10
Heard other CVD and diet are related	58	39	48	55	54
Named cholesterol as factor	26	11	14	29	22
Named fats as factor	18	11	13	18	17
Named alcohol as factor	13	10	14	12	14
Named salt or sodium as factor	11	10	10	11	10
Heard salt or sodium may be harmful	73	62	70	72	65
Named hypertension	51	44	57	48	41
Heard cholesterol or saturated fats may be harmful	63	47	51	64	53
Named heart or coronary problems	42	27	22	47	27
Named atherosclerotic disease	26	12	16	33	15
<b>Concern:</b>					
Concerned with salt or sodium	61	55	63	48	56
On medically prescribed diet	12	16	15	5	27
Concerned with fat	60	49	60	59	55
On medically prescribed diet	13	15	21	6	20
Concerned with cholesterol	65	57	67	65	67
On medically prescribed diet	12	17	17	4	27

people in 10 had heard about problems possibly associated with consumption of saturated fats or cholesterol; nearly all of them named CVD.

As a consequence, public concern with these substances is high: only a third of the population was unconcerned about any of them. The major reason for concern about sodium was hypertension. While 60 percent of people were concerned about fats, only 7 percent were concerned specifically about saturated fats. The primary reason for concern with fats was the caloric content, with only a third of concerned consumers naming CVD or cancer.

As noted previously (2), the public approaches nutrition and food constituents with primarily a risk-avoidance rather than a benefit-seeking orientation. Further, this risk-avoidance strategy appears to be increasingly focused on long-term risks such as CVD and cancer rather than on immediate dangers such as microbial or insect contamination or lack of purity. As public awareness of relationships—proved, postulated, or imagined—between diet and long-term disease grows, this focus may be expected to continue to increase in importance. The current study provides a baseline against which future studies can be compared.

**References** .....

1. Heimbach, J. T.: Yesterday, today, and tomorrow: consumer perceptions of food safety. Food and Drug Administration, Division of Consumer Studies, Washington, DC, 1981.

2. Heimbach, J. T., and Stokes, R. C.: FDA 1978 consumer food labeling survey. Food and Drug Administration, Division of Consumer Studies, Washington, DC, 1979.

3. Heimbach, J. T., and Stokes, R. C.: Nutrition labeling and public health: survey of American Institute of Nutrition members, food industry, and consumers. *Am J Clin Nutr* 36: 700-708 (1982).

4. Groves, R. M., and Kahn, R. L.: Surveys by telephone—a national comparison with personal interviews. New York, Academic Press, 1979.

5. U.S. Bureau of the Census: Statistical abstract of the United States: 1982-83 (103rd edition). GPO order No. 003-024-05839. Washington, DC, 1982.

6. Wolfe, L. M.: Characteristics of persons with and without home telephones. *J Marketing Res* 16: 421-425 (1979).

7. Cummings, K. M.: Random digit dialing: a sampling technique for telephone surveys. *Public Opinion Q* 43: 233-243 (1979).

8. Heimbach, J. T., and Orwin, R. G.: Public perceptions of sodium labeling. *J Am Diet Assoc* 84: 1217-1219 (1984).

9. Heimbach, J. T.: The public response to labeling of the sodium content of foods. NTIS report No. PB83-192583. National Technical Information Service, Springfield, VA, 1983.

10. Heimbach, J. T.: Public understanding of food label information. Food and Drug Administration, Washington, DC, 1982.

11. National Heart, Lung, and Blood Institute: The public and high blood pressure. NIH publication No. 81-2118. Bethesda, MD, 1981.

12. Woman's Day Magazine-Food Marketing Institute: Nutrition vs. inflation. The battle of the eighties (2nd Woman's Day-FMI Family Food Study). Woman's Day, Greenwich, CT, 1980.

13. Changing food preparation and eating habits. The Gallup Organization, Princeton, NJ, 1980.